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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,303

04/29/2005

Hisanori Itoh

SAE-0033

4774

23353

7590

02/12/2008

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EXAMINER

WILSON, MICHAEL H

ART UNIT

PAPER NUMBER

4145

MAIL DATE

DELIVERY MODE

02/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/533,303

**Applicant(s)**

ITO ET AL.

**Examiner**

MICHAEL H. WILSON

**Art Unit**

4145

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- Paper No(s)/Mail Date 20050623
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement filed June 23, 2005 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because:

Non-patent literature reference CL, "Organometallic Complex (Yukikinzokusakutai)", Jikken Kagaku Koza, 4th Edition, Vol. 18, page 413. is missing publication year.

It has been placed in the application file, but the above mentioned document has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the statement "provided that when the adjacent two rings are nitrogen-containing aromatic heterocyclic groups, the cases where Y is a chlorine atom are excluded, and that when the nonadjacent two rings are nitrogen-containing aromatic heterocyclic groups, the cases where Y is a group other than a halogen atom are excluded" renders the claim indefinite because it is unclear what the quoted limitations are referring to and if they are required.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Cardenas et al. (*Organometallics* 1999, 18, 3337-3341).

Regarding claims 1-4, Cardenas et al. discloses the platinum complex as represented in instant formulae [1], [1'], [1a'], and [1b'] (3338, scheme 1 compound 6).

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6. Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Annibale et al. (*Polyhedron* 1995, 14(3), 451-453).

Regarding claim 15, Annibale et al. discloses a method for producing a platinum complex:

- having a tridentate ligand, and having a halogen atom (page 453, preparation of (2)),
- characterized by using a platinum diene complex represented by the general formula  $Pt(X)_2(D)$  as a platinum source (page 453, preparation of (2)).

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Constable et al. (*J. Chem. Soc. Dalton Trans.* 1990, 443-449).

Regarding claim 1, Constable et al. discloses the platinum complex as represented in instant formula [1] (page 444, compound  $[Pt(L)Cl]$ ).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 5, 6, and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Constable et al. (*J. Chem. Soc. Dalton Trans.* 1990, 443-449) as applied to claim 1 in view of Jude et al. (*Inorg. Chem.* 2002, 41, 2275-2281).

Regarding claims 5 and 6, Constable et al. discloses all the claim limitations as set forth above. Additionally the reference discloses platinum(II) complexes with ancillary ligands of chloride, acetonitrile, and cyanobenzene. The reference does not disclose complexes with ancillary ligands of other halides. While Constable et al. anticipates chloride ancillary ligands, the reference does not anticipate the use of other halides.

Jude et al. teaches similar tridentate NCN type platinum(II) complexes with bromide, iodide and chloride ancillary ligands (page 2276, experimental section, compounds 1, 2, and 3). The reference also teaches that the halides can be switched by simple metathesis reactions and with high yield (page 2277, synthesis, paragraph 2, sentences 1-2). It would be obvious to a person of ordinary skill at the time of the invention given the similar complexes of Jude et al. with different halides, that similar platinum complexes could be made using the ligand of Constable et al. and the halides

of Jude et al. in order to obtain more complexes for the purposes of the prior art. One of ordinary skill would expect such complexes to have similar properties and could be used for the same purpose because halides and well known effects on platinum complexes. Use of different halides would amount to nothing more than use of a known compound in a known environment to product entirely expected results.

Regarding claim 14, modified Constable et al. discloses all the claim limitations as set forth above. Constable et al. also discloses methods of replacing the halide of the platinum(II) complex with other ligands (page 444;  $[\text{PtL}(\text{PhCN})][\text{PF}_6]$ , and  $[\text{PtL}(\text{MeCN})][\text{PF}_6]$  method ii), but does not disclose replacing the chloride with another halide.

Jude et al. teaches how to exchange halide ligands using similar tridentate NCN type platinum(II) complexes under similar conditions (page 2277, synthesis, paragraph 2, sentences 1-2). It would be obvious to a person of ordinary skill at the time of the invention to combine the halide exchange reaction of Jude et al with the platinum(II) complex of modified Constable et al. in order to replace the chloride ligand with another halide. One of ordinary skill would expect success given that both references use tridentate NCN platinum(II) complexes and both show the chloride ligand to be exchangeable under mild conditions and short reaction times (Constable page 444  $[\text{PtL}(\text{PhCN})][\text{PF}_6]$ , and  $[\text{PtL}(\text{MeCN})][\text{PF}_6]$  method ii; Jude page 2276,  $\text{Pt}(\text{pip}_2\text{NCN})\text{Br}$  and  $\text{Pt}(\text{pip}_2\text{NCN})\text{I}$  method A). Such a method would amount to nothing more than use of known compounds in a known environment to product entirely expected results.

11. Claims 1, 7- 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055) in view of Arena et al. (*Inorg. Chem.* 1998, 37, 2763-2769).

Regarding claims 1, 7- 9, Lai et al. discloses the platinum(II) complex bearing a tridentate ligand as defined for formulae [1], [1<sup>'''</sup>] and [1a<sup>'''</sup>] and a chloride, pyridine, pyrazole, or phosphine ancillary ligand (abstract). Lai et al. also disclose that the chloride ligand is facile allowing derivative complexes with different ancillary ligands to be synthesized (page 4049, results and discussion, synthesis and characterization, first paragraph). The reference does not disclose use of ancillary ligands that bind to the metal through a carbon, such as phenyl.

Arena et al. teach tridentate (terpyridine) platinum(II) complexes with chloride, methyl and phenyl ancillary ligands (abstract). Arena further discloses the effect such an ancillary ligand has on the photophysical properties of tridentate platinum(II) complexes (page 2768, luminescent properties paragraphs 1-4).

It would be obvious to a person of ordinary skill at the time of the invention to use the phenyl ligand of Arena et al. with the complex of Lai et al. in order to obtain more complexes for the purposes of the prior art. One of ordinary skill would expect compounds bearing the tridentate ligand of Lai et al. and a phenyl to have similar properties and could be used for the same purpose. Further one of ordinary skill would desire the use of an aryl, such as phenyl, as the ancillary ligand for the specific effects such a ligand would have on the photophysical properties of the complex. Thus use of



phenyl as an ancillary ligand would amount to nothing more than use of a known compound in a known environment to product entirely expected results.

12. Claims 10, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Constable et al. (*J. Chem. Soc. Dalton Trans.* 1990, 443-449) in view of Jude et al. (*Inorg. Chem.* 2002, 41, 2275-2281) as applied to claim 5 above, and further in view of Annibale et al. (*Polyhedron* 1995, 14(3), 451-453).

Regarding claim 10, modified Constable et al. discloses all the claim limitations as set forth above. The reference uses  $K_2PtCl_4$  with the tridentate ligand of instant formula [3] to synthesize platinum(II) complexes (page 444, [PtL(CI)] method i). Jude et al. use  $Pt(COD)_2$ , a platinum(II) diene complex of instant formula [2] to synthesize similar platinum(II) complexes (page 2276,  $Pt(pip_2NCN)I$  method B).

Annibale et al. teach similar tridentate platinum(II) complexes can be made using either  $Pt(COD)Cl_2$  or  $K_2PtCl_4$  (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4). The reference teaches that using  $Pt(COD)Cl_2$  significantly shortens the reaction time, increases yield, and simplifies purification of the product (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4).

It would be obvious to a person of ordinary skill at the time of the invention to use  $Pt(COD)_2$  of Jude et al. with the ligand of Constable to produce a complex with iodide as the ancillary ligand. One of ordinary skill would reasonably expect success given hat Jude et al. use  $Pt(COD)_2$  to make tridentate platinum(II) complexes that are similar to

those of Constable et al. Further one of ordinary skill at the time of the invention would be motivated to use  $\text{Pt}(\text{COD})\text{I}_2$  based on the teachings of Annibale et al. that using  $\text{Pt}(\text{COD})\text{Cl}_2$ , a nearly identical complex which differs only in the halide, will reduce reaction time, increase yield, and simplify purification.

Regarding claims 11-13, modified Constable et al. discloses all the claim limitations as set forth above. The reference uses  $\text{K}_2\text{PtCl}_4$  with the tridentate ligand of instant formula 3 to synthesize platinum(II) complexes (page 444, [PtL(Cl)] method i). Jude et al. teaches use of a halogenating agent on the tridentate platinum chloride complex for substituting the chloride for another halide (Jude, page 2277, results and discussion, synthesis paragraph 2).

Annibale et al. teach similar tridentate platinum(II) complexes can be made using either  $\text{Pt}(\text{COD})\text{Cl}_2$  or  $\text{K}_2\text{PtCl}_4$  (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4). The reference teaches that using  $\text{Pt}(\text{COD})\text{Cl}_2$  significantly shortens the reaction time, increases yield, and simplifies purification of the product (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4). It would be obvious to a person of ordinary skill at the time of the invention to use  $\text{Pt}(\text{COD})\text{Cl}_2$  of Annibale et al. with the ligand of Constable in order to reduce reaction times, increase yield, and simplify purification. One of ordinary skill would reasonably expect success given that the products in both references can be synthesized under similar reaction conditions using  $\text{K}_2\text{PtCl}_4$ , and both tridentate platinum(II) products are similar in structure and properties.

Further regarding claim 13, while modified Constable also discloses halide exchange, the reference does not disclose the exchange carried out in one pot. Jude et al. teach that halide metathesis can be carried out in acetone, a water-like solvent. One of ordinary skill at the time of the inventions would readily recognize that that the halogenating agents used would be soluble and could be used in the reaction mixture of modified Constable. Thus it would be obvious to one of ordinary skill at the time of the invention to perform the entire synthesis in a one pot. Further one of ordinary skill would be motivated to perform the synthesis in one pot in order to increase the reaction yield, reduce total reaction time, and simplify the synthetic scheme.

13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Annibale et al. (*Polyhedron* 1995, 14(3), 451-453) in view of Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055).

Regarding claim 16, modified Annibale et al. discloses all the claim limitations as set forth above. Further Annibale et al. disclose that using  $\text{Pt}(\text{COD})\text{Cl}_2$  significantly shortens the reaction time, increases yield, and simplifies purification of the product over the use of  $\text{K}_2\text{PtCl}_4$  as a starting material (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4). The reference does not explicitly disclose using a ligand of instant formula 3 as the tridentate ligand.

Lai et al. teach a method of making tridentate platinum(II) complexes of instant formula [1c'] using a tridentate ligand of instant formula 3. It would be obvious to a person of ordinary skill at the time of the invention to use the ligand of Lai et al. with the

Pt(COD)Cl<sub>2</sub> method of Annibale et al. in order to make a platinum complex bearing a tridentate ligand with a carbon bond directly to the metal center. One of ordinary skill would reasonably expect such a tridentate ligand to be a suitable ligand for a luminescent platinum(II) complex since tridentate ligands, like phenyl-bipyridine, have been studied with platinum(II) complexes and have known effects on the luminescent and chemical properties of the platinum(II) complex. Further, one of ordinary skill would reasonably expect a method of synthesizing the above complex to succeed given that the products in both references can be synthesized under similar reaction conditions using K<sub>2</sub>PtCl<sub>4</sub>, and both tridentate platinum(II) products are similar in structure and properties.

14. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Annibale et al. (*Polyhedron* 1995, 14(3), 451-453) in view of Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055).

Regarding claims 17, Annibale et al. discloses a method for producing a platinum complex, having a tridentate ligand, and having a halogen atom (page 453, preparation of (2)), and characterized by using a platinum diene complex represented by the general formula Pt(X)<sub>2</sub>(D) as a platinum source (page 453, preparation of (2)). The reference also discloses that using Pt(COD)Cl<sub>2</sub> significantly shortens the reaction time, increases yield, and simplifies purification of the product over the use of K<sub>2</sub>PtCl<sub>4</sub> as a starting material (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate,

paragraphs 1 and 4). The reference does not explicitly disclose using a ligand of instant formula 3 as the tridentate ligand.

Lai et al. teach a method of making tridentate platinum(II) complexes of instant formula [1c"] using a tridentate ligand of instant formula 3. It would be obvious to a person of ordinary skill at the time of the invention to use the ligand of Lai et al. with the Pt(COD)Cl<sub>2</sub> method of Annibale et al. in order to make a platinum complex bearing a tridentate ligand with a carbon bond directly to the metal center. One of ordinary skill would reasonably expect such a tridentate ligand to be a suitable ligand for a luminescent platinum(II) complex since tridentate ligands, like phenyl-bipyridine, have been studied with platinum(II) complexes and have known effects on the luminescent and chemical properties of the platinum(II) complex. Further, one of ordinary skill would reasonably expect a method of synthesizing the above complex to succeed given that the products in both references can be synthesized under similar reaction conditions using K<sub>2</sub>PtCl<sub>4</sub>, and both tridentate platinum(II) products are similar in structure and properties.

15. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Constable et al. (*J. Chem. Soc. Dalton Trans.* 1990, 443-449) in view of Annibale et al. (*Polyhedron* 1995, 14(3), 451-453) and in view of Jude et al. (*Inorg. Chem.* 2002, 41, 2275-2281).

Regarding claims 18-20, Constable et al. disclose a method of making platinum(II) complexes with a tridentate ligand of instant formula 3. The reference uses

K<sub>2</sub>PtCl<sub>4</sub> as a starting material instead of a platinum(II) diene, and does not disclose use of a halogenating agent to replace the chloride ligand.

Annibale et al. teach a method of making platinum(II) complexes by allowing a platinum(II) diene complex of instant formula [2b], Pt(COD)Cl<sub>2</sub>, and a tridentate ligand to react (page 453, preparation of [Pt(terpy)Cl]Cl<sub>2</sub>·H<sub>2</sub>O). The reference discloses that use of Pt(COD)Cl<sub>2</sub> significantly shortens the reaction time, increases yield, and simplifies purification of the product (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4).

It would be obvious to a person of ordinary skill at the time of the invention to use Pt(COD)Cl<sub>2</sub> of Annibale et al. in the method of Constable in order to reduce reaction times, increase yield, and simplify purification. One of ordinary skill would reasonably expect success given that the products in both references can be synthesized under similar reaction conditions using K<sub>2</sub>PtCl<sub>4</sub>, and both tridentate platinum(II) products are similar in structure and properties.

Jude et al. teach use of a halogenating agent on similar platinum chloride complexes for substituting the chloride ligand with another halide (page 2277, synthesis, paragraph 2, sentences 1-2). It would be obvious to a person of ordinary skill at the time of the invention to combine the halide exchange reaction of Jude et al. with the platinum(II) complex of modified Constable et al. in order to replace the chloride ligand with another halide. One of ordinary skill would expect success given that both references use platinum(II) complexes bearing similar tridentate ligands and both show the chloride ligand to be exchangeable under mild conditions and short reaction

times (Constable page 444 [PtL(PhCN)](PF<sub>6</sub>), and [PtL(MeCN)](PF<sub>6</sub>) method ii; Jude page 2276, Pt(pip<sub>2</sub>NCN)Br and Pt(pip<sub>2</sub>NCN)I method A). Further one of ordinary skill would elect a specific halide as the ancillary ligand for the specific known effects the halide would have on the photoluminescent and chemical properties of the complex. Such a method would amount to nothing more than use of known compounds in a known environment to product entirely expected results.

Further regarding claim 20, while modified Constable discloses halide exchange, the reference does not disclose the exchange carried out in one pot. Jude et al. teach that halide metathesis can be carried out in acetone. One of ordinary skill at the time of the inventions would readily recognize that that the halogenating agents used would be soluble and could be used in the reaction mixture of modified Constable. Thus it would be obvious to one of ordinary skill at the time of the invention to perform the entire synthesis in a one pot. Further one of ordinary skill would be motivated to perform the synthesis in one pot in order to increase the reaction yield, reduce total reaction time, and simplify the reaction scheme.

16. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Constable et al. (*J. Chem. Soc. Dalton Trans.* 1990, 443-449) in view of Jude et al. (*Inorg. Chem.* 2002, 41, 2275-2281).

Regarding claims 21, Constable et al. disclose a method of making platinum(II) complexes with a tridentate ligand of instant formula 3. The reference does not disclose use of a halogenating agent to replace the chloride ligand to form instant complex [1d"].

Jude et al. teach use of a halogenating agent on similar platinum(II) chloride complexes for substituting the chloride ligand with another halide (page 2277, synthesis, paragraph 2, sentences 1-2). It would be obvious to a person of ordinary skill at the time of the invention to combine the halide exchange reaction of Jude et al. with the platinum(II) complex of modified Constable et al. in order to replace the chloride ligand with another halide. One of ordinary skill would expect success given that both references use platinum(II) complexes bearing similar tridentate ligands and both show the chloride ligand to be exchangeable under mild conditions and short reaction times (Constable page 444 [PtL(PhCN)][PF<sub>6</sub>], and [PtL(MeCN)][PF<sub>6</sub>] method ii; Jude page 2276, Pt(pip<sub>2</sub>NCN)Br and Pt(pip<sub>2</sub>NCN)I method A). Such a method would amount to nothing more than use of known compounds in a known environment to product entirely expected results.

17. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055) in view of Arena et al. (*Inorg. Chem.* 1998, 37, 2763-2769) as applied to claim 7 above and further in view of Annibale et al. (*Polyhedron* 1995, 14(3), 451-453) and in view of Merwin et al. (*Organometallics* 1992, 11, 2972-2978).

Regarding claim 22, modified Lai et al. disclose all the claim limitations as set forth above. Additionally, Lai et al. disclose a method of making platinum(II) complexes bearing tridentate ligands of instant formula 3. The reference uses K<sub>2</sub>PtCl<sub>4</sub> instead of a platinum diene of instant formula [2b], and does not teach use of a gringard reagent.



Annibale et al. teaches a method of making platinum(II) complexes by allowing a platinum(II) diene complex of instant formula [2b],  $\text{Pt}(\text{COD})\text{Cl}_2$ , and a tridentate ligand to react (page 453, preparation of  $[\text{Pt}(\text{terpy})\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ ). The reference discloses that use of  $\text{Pt}(\text{COD})\text{Cl}_2$  significantly shortens the reaction time, increases yield, and simplifies purification of the product (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4).

It would be obvious to a person of ordinary skill at the time of the invention to use  $\text{Pt}(\text{COD})\text{Cl}_2$  of Annibale et al. in the method of Constable in order to reduce reaction times, increase yield, and simplify purification. One of ordinary skill would reasonably expect success given that the products in both references can be synthesized under similar reaction conditions using  $\text{K}_2\text{PtCl}_4$ , and both tridentate platinum(II) products are similar in structure and properties.

Merwin et al. teach use of a Grignard reagent to replace chloride ligands of a platinum(II) complex with alkyl or methyl ligands (page 2973, first paragraph of results and discussion). It would be obvious to a person of ordinary skill at the time of the invention to use a Grignard reagent with a platinum(II) complex to replace a chloride ligand with an aryl in order to obtain more complexes for the purposes of the prior art. One of ordinary skill would reasonably expect success because the Grignard reagent is taught to react with the platinum(II) metal center replacing chloride ligands and does not react with the other organic ligands (page 2973, results and discussion, synthesis of  $[(\text{R}_1)_2\text{CH}_2\text{CH}_2\text{P}(\text{R}_1)_2]\text{Pt}(\text{R})_2$  complexes, first paragraph).

18. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055) in view of Arena et al. (*Inorg. Chem.* 1998, 37, 2763-2769) as applied to claim 7 above and further in view of Merwin et al. (*Organometallics* 1992, 11, 2972-2978).

Regarding claim 23, modified Lai et al. disclose all the claim limitations as set forth above. Additionally, Lai et al. disclose a method of making platinum(II) complexes wherein a platinum(II) complex of instant formula [5],  $K_2PtCl_4$ , is allowed to react with a ligand of instant formula 3 to form a complex of instant formula [1c"]. The reference does not teach use of a gringard reagent.

Merwin et al. teach use of a gringard reagent to replace chloride ligands of a platinum(II) complex with alkyl or methyl ligands (page 2973, first paragraph of results and discussion). It would be obvious to a person of ordinary skill at the time of the invention to use a gringard reagent with a platinum(II) complexes replacing a chloride ligand with an aryl in order to obtain more complexes for the purposes of the prior art. One of ordinary skill would reasonably expect success because the gringard reagent is taught to react with the platinum(II) metal center replacing chloride ligands and does not react with the other organic ligands (page 2973, results and discussion, synthesis of  $[(R_1)_2CH_2CH_2P(R_1)_2]Pt(R)_2$  complexes, first paragraph).

19. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (*Inorg. Chem.* 1999, 38, 4046-4055) in view of Arena et al. (*Inorg. Chem.* 1998, 37, 2763-2769) as applied to claim 7 above and further in view of Annibale et al.

(*Polyhedron* 1995, 14(3), 451-453) and in view of Janka et al. (*Organometallics* 2000, 19, 5071-5076).

Regarding claim 24, modified Lai et al. disclose all the claim limitations as set forth above. Additionally, Lai et al. disclose a method of making platinum(II) complexes bearing tridentate ligands of instant formula 3. The reference uses  $K_2PtCl_4$  instead of a platinum diene of instant formula [2b] and does not teach use of a gringard reagent.

Annibale et al. teaches a method of making platinum(II) complexes by allowing a platinum(II) diene complex of instant formula [2b],  $Pt(COD)Cl_2$ , and a tridentate ligand to react (page 453, preparation of  $[Pt(terpy)Cl]Cl_2 \cdot H_2O$ ). The reference discloses that use of  $Pt(COD)Cl_2$  significantly shortens the reaction time, increases yield, and simplifies purification of the product (page 452, Chloro(2,2':6',2''-terpyridine)platinum(II)chloride dihydrate, paragraphs 1 and 4).

It would be obvious to a person of ordinary skill at the time of the invention to use  $Pt(COD)Cl_2$  of Annibale et al. in the method of Constable in order to reduce reaction times, increase yield, and simplify purification. One of ordinary skill would reasonably expect success given that the products in both references can be synthesized under similar reaction conditions using  $K_2PtCl_4$ , and both tridentate platinum(II) products are similar in structure and properties.

Janka et al teach using  $Pt(COD)Cl_2$ , a platinum diene of instant formula [2b], with a gringard reagent (page 5071, results and discussion, first paragraph). The product of those reagents is then reacted with a ligand to make the product. It would be obvious to a person of ordinary skill at the time of the invention to use a gringard reagent as used

by Janka et al. with the method of modified Lai et al. in order to place an aryl ancillary ligand on the platinum(II) complex. Further, one of ordinary skill would reasonably expect an aryl ligand to be a suitable ancillary ligand for a platinum(II) complex, and desire to use such a ligand, as aryl ligands, such as phenyl, have been studied with platinum(II) complexes and have known and predictable effects on the photophysical properties of the complex. Use of a Grignard reagent would amount to nothing more than use of a known compound for its intended use in a known environment to produce entirely expected results.

### ***Conclusion***

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Che et al. (US 2002/0179885 A1), Hou (US 2006/0228579 A1) and Sowinski et al. (US 6,824,895 B1) each disclose platinum(II) complexes bearing tridentate ligand and various monodentate ancillary ligands disclosed for use in organic electroluminescent devices.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL H. WILSON whose telephone number is (571)270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on (571) 272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

22. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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